ON THE DRAINAGE OF A PART OF LONDON.

WITH A DESCRIPTION OF THE KING'S SCHOLARS' POND SEWER.*

At the present day it would be superfluous to dwell at any length upon the benefits derivable in a social point of view from a complete and efficient system of drainage. Its necessity and importance are now universally recognized and admitted; a fact not only evidenced by the very generally expressed desire upon the part of the community to promote its extension, but likewise by several recent legislative enactments framed for its special provision and regulation, and the still increasing interest elicited by the subject.

The wisdom of ancient Rome was not the less conspicuous in her external policy than by those internal arrangements and municipal regulations by which the health, comfort, or convenience of her citizens appear to have been specially studied; and certainly among those public edifices and monuments, whose magnificence is recorded by the historian, or whose ruins now arrest the attention of the traveller, there are none which more forcibly exhibit to us the wealth, magnitude, and extent of the Roman city, than the remains of those subterranean adits formed to receive and convey away the sewage and refuse of her immense population.

In a warm climate, and among a people where the bath may be considered the almost indispensable luxury and appendage of every dwelling, it is obvious that, next to providing the requisite supply of water, the most important consideration was to secure a ready and expeditious means of discharging the waste from each, as well as from the numerous public fountains and aqueducts of the city: we accordingly find the arrangement and conservation of the sewers to have been at all times an object of especial care on the part of the Roman government.

The laying out and construction of the Roman sewerage upon any definite and regular system is said to have been first commenced in the reign of Tarquinius Priscus, about 600 years before the Christian era. To the same period is ascribed the building of the Cloaca Maxima, a work of both historical and architectural interest, since in its date is involved the question of the antiquity of the arch. Some writers, however, are disposed to attribute the present covering of the Cloaca Maxima to a much later period, probably when the sewers generally were repaired by M. Agrippa. But a monument which still continues to exist, after the lapse of nearly twenty-five centuries, may, independent of any other circumstance, still excite our interest and admiration, more especially when we consider that in the midst of the degradation and ruin attending her proudest works of art, this great and useful structure of the Roman city retains in some degree its original purpose, and may still be supposed to minister to the health and comfort of her modern citizens.

The arch of the Cloaca Maxima is formed in three concentric semicircular rings, with an aggregate thickness of 5 feet 11 inches. It is built of Peperino stone, and there are occasional introductions of large blocks of Travertine, which no doubt have been inserted in some of the later reparations of the sewer. The interior is perfectly regular, and for so much as remains in continuation, which is about 44 feet, is generally in good preservation; it is about 13 feet in width, and as many in height. In the walls are stone brackets to support the ends of the waste pipes of the fountains; each block of stone measures 7 Roman palms 3 inches in length, and 4 palms 4 inches in thickness. The course of the Cloaca Maxima corresponded nearly with what has been considered to be the most ancient limits of the city. It had its origin very near the site of the arch of Severus, then it passed under the Via Sacra to the Temple of Julius, turning thence under the Via Nova, and skirting the Palatine Hill to the Forum Boarium, which it crossed; it proceeded in a straight line towards the Tiber, into which it discharged a little below the Ponte Rotto, and nearly beneath the "little Temple of Vesta," the whole length being altogether about 1,800 feet (2,500 palms).

As affording some notion of the importance and extent of the Roman sewerage, it is recorded by Dionysius of Halicarnassus that upon an occasion when they had become neglected, the censors concluded a contract for their cleansing and reparation for the sum of 1,300 talents, equal to 193,000*l.* For the maintenance of the public sewers, there was a tax levied called the cloacarium, and in the time of the emperors they were placed under the control and charge of the public officers specially appointed for the purpose. In regarding the extent of these works and the great expenditure which must have necessarily been incurred by the Romans in the perfecting and maintaining such a system of sewerage, we must not lose sight of their extreme and vital importance to a city, of which the ordinary daily supply of water by the various aqueducts alone, irrespective of that derived from wells and other sources, has been estimated at 50 millions of cubic feet, a quantity nearly ten times the present supply of the metropolis by the different water companies, and of which some adequate notion may be formed when we consider that it is more than equivalent to that contained by a lake 380 acres in extent, and 3 feet in depth. However large, therefore, the capacity of the Cloaca Maxima may appear, it cannot be considered much more than adequate to the ordinary duty it had to perform even in dry seasons, and without the concurrence of those sudden and violent storms to which the climate and latitude of Rome are subject.

In England the earlier statutes and laws, upon which the constitution of the different commissions of sewers is based, appear to have had more particular reference to the drainage of open fen-lands, and the protection of districts subject to inundation, or the overflow of the tide. In fact, in the establishment of the various commissions, little else was contemplated beyond providing a quick and ready conveyance of the surface-waters to their respective outfalls. The circumstance, however, of several of the commissions of sewers embracing within their jurisdiction large portions of town districts have, in complicating their functions, necessarily induced an extension of the objects for which they were originally founded.

Before the general adoption of arched sewers, London was subject to the plague and other periodical endemics; and the accounts of contemporary writers of the filthy and disgusting state of the public streets, arising from a want of proper municipal regulation and defective drainage, even so recently as towards the close of the seventeenth century, are scarcely at the present time credible; and the surprise is not so much at the often times fatal and devastating effects of these visitations, but that the city should ever have been free from their influence.

The intimate connection between the sanatory condition of a town and its state of drainage was strikingly illustrated by Dr. Southwood Smith in his evidence before the committee of the Health of Towns. "If," said he, "you were to take a map, and mark out the districts which are the constant seats of fever in London, as ascertained by the records of the fever hospital, and at the same time compare it with a map of the metropolis, you would be able to make out invariably, and with absolute certainty, where the sewers are, and where they are not, by observing where fever exists; so that we can always tell where the Commissioners of Sewers have been at work by the track of fever."

From a strict and perhaps necessarily limited interpretation of the original statutes on the subject, it was not before the commencement of the present century that soil-drainage was allowed to be passed into the public sewers; previously to that period each house had its system of cesspools, into which not only was discharged the whole of the excrementitious matter of the inhabitants, but the almost equally offensive auillage of the sinks and scullieries of the dwellings, the cleansing of which cesspools was a regular and periodical operation, entailing great expense not only to the occupiers, but likewise much annoyance to the inhabitants of the vicinity. This system, however, is happily almost superseded, and the business of nightman, formerly so offensive, is now scarcely known.

But upon closer investigation, and taking into consideration the circumstances of the period, the necessity for cesspools, and consequently these restrictions, were not without some reasonable ground; the limited supply of water for domestic purposes was considered insufficient to drive the more solid matter through the drains into the sewers. This objection, however, can no longer hold, since the water supplied by the different companies is both abundant and sufficient to act as an effectual scour not only to the private drains of the houses, but also to the public sewers into which they are discharged.

The metropolis and its immediate vicinity is divided among seven different commissions or trusts, in whom are vested the charge and control of the public sewers, with the power of raising rates for their maintenance and improvement. Among these the most important, both from the value of the property within its operation and the extent of country subject to its administration, is the Commission for the "City and Liberty of Westminster and part of Middlesex," the active jurisdiction of which extends from Temple Bar, along the northern shore of the river Thames to Fulham, and northwards from the Thames as far as Hampstead and Willesden.

This district, comprising an area of nearly 18 square miles, is divided into four divisions or valleys, upon which separate assessments of the sewers' rates are levied. These are known as the eastern and western divisions of the Westminster Sewers, the Ranelagh, and the Counters Creek. The above arrangement is not arbitrary, but is indicated and marked out by the natural configuration of the country itself, being in fact four distinct levels of drainage, each discharging, independently by its own outlets, the waters collected on its surface.

With these few general observations I shall at once proceed to the main object of the present paper, which is to give a brief description of some of the most important improvements effected within the last few years in the sewerage of the second or western division of the Westminster Sewers, more particularly as connected with its main line of outfall—the "King's Scholars' Pond Sewer," which receives by its various collateral branches nearly the whole drainage of this district. The course of this main sewer is pretty nearly through the centre of the valley or district drained by it, and almost in the channel formerly occupied by a rivulet known in early days as the Aye brook, having its source at Hampstead, from the overflow of a spring still in existence, called the Shepherds' well. This, before its stream had become polluted by the encroachment of buildings on its banks, supplied a pond used in those times by the King's Scholars of Westminster for bathing, and supposed to be situated somewhere near to the present site of Vincent-square, from whence it is believed originated the present name of this sewer. The whole area of the western district is about 2,300 acres, of which nearly 2,000 are drained by the King's Scholars' Pond sewer; of this surface about 1,500 acres are covered by streets and houses, the number of assessments being about 16,000.

In considering the King's Scholars' Pond sewer as a discharging line of drainage, it must be borne in mind that there belongs to it this essential feature peculiarly distinguishing it from the Fleet, the Ranelagh, or other main outfalls of the metropolis, and which involves a principle of operation entirely differing from them. I allude to the fact, that the whole of the lower portion of the district drained by this sewer, including the larger section of Westminster, comprising an area of nearly 500 acres of valuable house property, is below the ordinary high tide level of the Thames.

As a security to this low district, it is therefore essential that a free emission of the sewage into the river be restrained always at that point by which it might through the ingress of the tide be affected, and consequently the action of the discharge is necessarily limited by gates at the outlet to a short period preceding and subsequent to the flood, being altogether scarcely six hours in the twelve. As an additional protection against any sudden and accidental irruption of the tide, each of the collateral sewers and drains of the main line is carefully guarded, as far as the high tide level, by self-acting flaps.

Thus it is obvious, that independently of receiving and discharging the drainage of a surface amounting to upwards of 2,000 acres,

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